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ABSTRACT

Ways in which institutions of higher education can provide more meaningful information to students, especially prospective students, were studied. The specific study objective was to investigate the meaningfulness/understandability and comparability of written formats and to explore possible differences associated with age, ethnicity, program/major, type of institution/region, and level of education. Data gathered by the National Center for Higher Education Management Systems, which constituted the Better Information for Student Choice data base on written formats, were used. Subjects were 423 college freshmen representing different sectors of higher education. Subjects selected among five written formats (tables, tables and cartoons, script paragraph, question and answer, and charts and graphs) in responding to the questions about the most understandable and meaningful information. The type of information display was found to affect the ability of a person to process information. Different segments of the population were also found to respond in different ways to written formats. The primary finding is that the format selected by the large majority of respondents as being meaningful and useful in making comparisons was the tabular format, not the script format. Tables with cartoons were selected second-most frequently as the most meaningful format. Charts and graphs were selected second-most frequently for comparing information. A bibliography is included. (SW)

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GUIDELINES FOR PRESENTING MORE MEANINGFUL INFORMATION (IN THE COLLEGE/UNIVERSITY MARKETING PROGRAM)*

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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THE ASSOCIATION FOR INSTITUTIONAL RESEARCH

This paper was presented at the Twentieth Annual Forum of the Association for Institutional Research held at the Peachtree Plaza Hotel in Atlanta, Georgia, April 27 - May 1, 1980. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum papers.

Mary Corcoran
University of Minnesota
(Editor, AIR Forum Publications)

INTRODUCTION

Higher education is in the throes of change. Various trends have forced higher education institutions to search for new clientele and new institutional directions and to explore new modes of communicating with their prospective clientele. Some of these trends are:

- Decline of the traditional clientele, (i.e., the cohort of graduating high school seniors) is approaching reality. Projections indicate that enrollments will decline through the 1980s (Dresch, 1977),
- Student consumerism (students making selective choices of educational services that satisfy their needs) is a growing phenomenon that is reinforced by recent legislation at the federal and state level (Higher Education Amendments of 1976) and by the upsurge of student lobbying organizations (National Student Educational Fund, United States Students Association), and
- Public concern over the purposes of education have led to open questioning of the outcomes of higher education and its "value" (evaluated in terms of return on investment, foregone income, actual cognitive, affective and economic outcomes, etc. Dresch, 1977, Witmer, 1971, Bowen, 1978, Bird, 1975).

During recent years, the activities associated with assessing the needed services of clientele and selectively matching those needs based on the functional role and capacity of the organization has gained wider purview in the higher education community. More recently, colleges and universities have depended upon student choice to allocate educational services, making the assumption that students are well-informed and making the "right" decisions. The marketing thrust, combined with research indicating that students are often not well informed or making the right decisions (Pantages and Creedon, 1978, Stark, 1977), have induced institutions to ask questions about their communications with students. One of the questions that remains unanswered is "How do we most effectively present meaningful information to students?" As detailed below this study sought to provide some answers to this question by exploring variables related to written information and to formats presenting that information.

What is Meaningful Information

It can be assumed from psychological research that the more meaningful the information "The easier it will be to learn." (Kretch, et al., 1969, pp. 316-317). Furthermore, Kretch finds that "Just as more meaningful items are generally more easily learned, so are they more easily retained." The movement to provide more meaningful information to student-decisionmakers has been most recently identified with the Better Information for Student Choice projects sponsored by the Fund for the Improvement of Postsecondary Education (FIPSE). The term "better" information which arose from the projects and subsequent interest and involvement in this area by institutions and their constituents, is subsumed by the concept of "meaningful" information as used by this author. Meaningful information provides relevant knowledge in a communicable format that is readily available and consumable by prospective students (as well as current students) to aid in forming a "best" answer to the major decisions they face.

Information and Total Institutional Marketing

Colleges and universities are employing to varying degrees marketing techniques as noted in a national study by Murphy and McGarrity (1978). This is occurring although many lack a comprehensive marketing program, which in many instances hinders the overall effectiveness of their actions (Gaither, 1979). Within a growing number of institutions marketing is, or is becoming, an organized and coordinated activity (see for example Litten, 1978, Steinberg and Davis, 1978, Lucas, 1974 and Leister, 1975). Marketing has been defined by Kotler (1975) as the:

> ...effective management by an organization of its exchange relations with its various markets and publics. All organizations depend upon exchange relations to attract resources that they need, to convert them into useful products and services, and to distribute them efficiently to target markets. Marketing is a systematic approach to planning and achieving desired exchange relations with other groups. (p. 13).

As Kotler points out in a subsequent article (Kotler, 1979), marketing is still misconstrued as selling. The marketing concept discussed here is a much broader concept than just selling as the definition indicates.

Development of an institutional marketing plan in most cases has been a reaction to the forces of decreasing enrollment (creating a buyer's market and expressed as the need to define the institutions target market) and the increase in student consumerism (which necessitates selectively meeting consumer needs). Although student consumerism may wane, institutions will continue to incorporate marketing as a means to maintaining their viability. Johnson (1979) describes the "total marketing concept" as bringing "people, programs, planning and process together in an objective-centered system that asks difficult questions," such as:

1. What business are we in?
2. Why do students attend our institutions?
3. Why do students continue at our institutions and why do they graduate?
4. Why do students leave?
5. Are we ignoring possible new markets?
6. Have we included all members of the college community in our marketing concerns and efforts?

Marketing in higher education has a primary function to provide the best fit between institutions and student resulting in the student making the best choice.

"For effective marketing, each program and course must "fit" student needs... The bridge is information. By getting the information needed for choices, the student is free to achieve his or her needs..." (Larkin, 1979).

Review of the Literature Related to Formating Written Information

The format of written information whether it is presented as a script (textual) paragraph, a line graph, or a table) may be related to how effectively the information is communicated in terms of how meaningful and understandable the information may appear, and how the format permits ease of comparison between similarly formated information. Research related to the presentation of written information has been at least a peripheral topic of study in several fields, such as psychology, education, communication, journalism, etc., and the area has been

studied from different viewpoints. Nonetheless, few studies provide direction in answering the questions posed in the present study.

Perhaps the investigation that is most closely related to the study at hand is the research conducted by Washburne (1927). In his study, graphic, tabular, and textual (in the present study termed script paragraphs) formats were used with a constant information set to ascertain if they had a differential effect on the learning of quantitative information. The findings of interest relative to this study are:

1. "The forms in which complex data are arranged make a decided difference in the resultant learning."

2. "Above a certain quite low limit of complexity number of data did not affect in any way the relative effectiveness of the various forms."

3. the smaller the quantity of information and the simpler the pattern the better the recall of specific amounts of information.

4. paragraph form (script) was found to be poorest of all when compared to another form and pictographs were generally surpassed by other forms.

5. the bar graph was best utilized in the recall of comparisons which involved a "fair" degree of difficulty.

6. line graphs were best for the recall of relative increase, decrease of fluctuation.

7. tables effectively present information that contains specific amounts.

More recently, Wolfe and Martuza (1976) point to the wide belief that graphs and tables are effective media for displaying quantitative data. Building graphs and tables is a skill taught by many disciplines, and are also used widely in journals, texts, etc.

Sciglimpaglia (1977) points out that "in the areas of marketing and consumer behavior, the question of how information format affects decisions has only recently been studied." He reviews two studies of note. In the first of these, Russo, Krieser, and Miyashita (1975) found that for most products studied consumer's utilized information displayed in summary (comparative) pricing lists

more effectively than the standard shelf unit-pricing. Chestnut (1976) used energy efficiency ratings of hypothesized lightbulbs to test for differences between a verbal description of energy ratings and a numerical description. His findings indicated that subjects who were exposed to the numerical information were better able to recall the information over the short-term, but those who used the verbal information had greater long-term memory of the ratings. Sciglimpaglia (1977) in his own study reports that "information display is probably at least as important as information load with respect to consumer research and public policy." He calls for further research in this area.

A review of the communications and journalism literature revealed several studies investigating the differential potential of the various media available today (print, radio, television, and combinations of the same). The findings indicate that "no generalization as to which medium might lead to less loss of information emerges from the literature," (Wilson, 1974) while L. D. Bart (1974) found that better comprehension results from print than from the three styles of radio delivery he tested.

In another area, Hoyt (1968, 1974) has found that using color cartoons in conjunction with tables is an effective means of presenting information to vocationally-technically oriented students ("specialty-oriented" students in Hoyt's terminology). A 1978 study by Williams found that for children pictures included in the text caused them to read more slowly. The slower reading effect was augmented for those who were poor readers as indicated by previous testing.

The "question and answer" format was used by several of the institutions participating in the Fund for the Improvement of Postsecondary Education's Better Information Project I (University of California at L.A., Syracuse University and Mountain Empire Community College in Virginia). At least one of the institutions, Mountain Empire, after conducting interviews, concluded that they should use the question and answer format since it seemed to present information most simply and directly.

In a series of experiments conducted in the early 1960s under a contract from the U.S. Air Force, Schutz (1961 a & b) evaluated graphic trend display formats (line graph, vertical bar graph, and horizontal bar graph) and methods of presenting multiple graphic trends.

The major findings of this study were:

- that line graphs were preferred, "followed closely" by vertical bar graphs (line graphs should be used to show time correlated data), and
- the use of color over black and white graphic displays only improve performance slightly.

Analysis of the NCHEMS Better Information for Student Choice data base yielded some preliminary findings reported in Lenning & Cooper (1978). Based on percentages of students selecting among five alternative formats, they found tables to be selected most often (9 of 12 items) as most meaningful. Tables were also found to be most useful for comparing two ficticious sets of information (College "A" and College "B") in 8 of 12 examples.

In answering the question, Does the Form of Institutional Communication to Prospective Students Make a Difference in "Better Information?" Lenning (1976) found that even though one may have the best information possible (proper type, content, level, and accuracy) it may not really be better information unless it is in a format that is understandable and meaningful, and it actually reaches the prospective students at the proper time for them and it is paid attention by them.

He found that institutional communication to prospective students can make a difference in more meaningful information, and discusses in detail seven factors or "communication characteristics of better information." They are listed as:

1. The information is delivered to the appropriate person.
2. The information communication is unmistakably designed to inform rather than sell.

3. The information is timed and sequenced.
4. The information has an organization and format that promotes understanding.
5. The information has an attention-getting and motivating form.
6. The information is in a form that facilitates use and application.
7. The information is communciated through an integrated dissemination system. (p. 4).

An important recent study by Chapman and Johnson (1979) investigated whether high school seniors understand college recruitment literature in terms of reading level. Their findings indicate that the reading difficulty level of college catalogues was much above their primary audience, the high school senior. Furthermore, as found in previous studies (Lenning & Cooper, 1978, Chapman and Johnson, 1979), college bound high school seniors have limited understanding of the basic terminology found in college catalogues. It should be noted that these terms are neither defined in the text nor are glossaries provided. Johnson and Chapman conclude that "colleges need to examine their recruitment literature for its level of presentation as well as its content."

Literature related to advertising indicates that format, "The totality of words, pictures, graphs, charts, etc..." (Gensch, 1973), is an important component in producing organized and meaningful information. The effective use of advertising principles can result in accessing the appropriate target population and communicating effectively with them. But, these principles appear to be based more upon experience and practice than experimentation.

The pertinent studies reviewed on formating written information indicate that only limited guidelines exist for developing these kinds of formats for presenting college related information. These studies also suggest that alternative presentational modes to the script (textual) paragraph format in dominant use should be investigated. Furthermore, providing more meaningful information depends upon the format that enhances its meaning and understanding, and is presented to the consumer at the appropriate point in decisionmaking.

This study investigated the ways in which institutions of higher education can provide more meaningful information to students--especially prospective students. More specifically, the study investigated the question "How can needed information best be presented to students so as to facilitate their assimilation of the material and foster improved decisionmaking?" Presently, institutions have few empirically derived sources of information that might serve as guidelines on how best to format, communicate, and disseminate college information.

The hypotheses derived for this study eminate from the need to develop means of empirically testing the meaningfulness/understandability and comparability of written formats. Furthermore, the hypotheses direct exploration for differences along these variables by selected and important market segmenting variables of age, ethnicity, program/major, type of institution/region of the country, and level of education. Specific hypotheses to be tested in this study were:

H_{1a}: Understandability/meaningfulness is equally effective for all of the tested written formats.

H_{1b}: Comparability between information developed for institution "A" and institution "B" is equivalent for all of the tested written formats.

H_{2a}: Sex of the respondent has no effect on the meaningfulness/understandability of the written formats tested.

H_{2b}: Sex of the respondent has no effect on the comparability of the written formats tested.

H_{3a}: Age of the respondent has no effect on the meaningfulness/understandability of the written formats tested.

H_{3b}: Age of the respondent has no effect on the comparability of the written formats tested.

H_{4a}: Ethnicity of the respondent has no effect on the meaningfulness/understandability of the written formats tested.

H_{4b}: Ethnicity of the respondent has no effect on the comparability of the written formats tested.

H_{5a}: Program/major of the respondent has no effect on the meaningfulness/understandability of the written formats tested.

H_{5b}: Program/major of the respondent has no effect on the comparability of the written formats tested.

H_{6a}: Type of institution/region of country of the respondent has no effect on the meaningfulness/understandability of the written formats tested.

H_{6b}: Type of institution/region of country of the respondent has no effect on the comparability of the written formats tested.

H_{7a}: Level of education (high school/college) has no effect on the meaningfulness/understandability of the written formats tested.

H_{7b}: Level of education (high school/college) has no effect on the comparability of the written formats tested.

Sample Design

The study used data gathered by the National Center for Higher Education Management Systems (NCHEMS), data which constituted the Better Information for Student Choice data base on written formats. Institutions that provided the student sample for the study (with the exception of the high school sample) had previously participated in an NCHEMS investigation of the information needs of college students. The survey of information needs (College Information Needs Questionnaire (CINQ)) discovered 29 items were rated most important, and these provided the item pool for the questionnaire investigating preferences for format ("Presenting Better Information Questionnaire" (PIBQ)). The colleges participating in the study represented different sectors of higher education. They were:

- Central State University (Edmond, Oklahoma)
- Colorado University (Boulder, Colorado)
- Drake University (Des Moines, Iowa)
- Seattle Pacific College (Seattle, Washington)
- Valencia Community College (Orlando, Florida)

Selection of the colleges/universities sample took place under the aegis of the campus coordinator. They were instructed to select a diverse group of new freshmen and have at least 30 respondents for each of the two forms of the questionnaire. This would provide a minimum sample of 300 respondents from the colleges/universities and a cell size of 30 respondents per school per form of the

questionnaire. The rationale in using a diverse but not necessarily random sample was to minimize the cost and effort of obtaining the college student sample. In consultation with the campus coordinators, the researchers ascertained that the experimental nature of the instruments devised to test the formats did not, in the scope of this initial study, warrant the greater cost and effort required to assure a random sample.

The sample of 65 high school students was selected systematically from college bound high school seniors in the Denver Public School System. These students were added to the data base by NCHEMS staff in the Fall, 1979 after it was determined a representative high school sample had not been previously collected. This resulted in total of 423 persons found in this NCHEMS data base.

Questionnaire Development

The development of the questionnaire (figure 1) proceeded in the following manner:

- Development of initial instrument,
- Feedback and revision,
- Pilot test, and
- Application in the field.

The data were arrayed into five formats that are in common use or are recommended for use in presenting written information:

- tables--this format is currently found in some college publications and is often used for institutional record keeping (i.e., the college's Fact Book and computer formats),
- tables with a pertinent cartoon--using tables paired with cartoons was found to be an effective format by Hoyt (1968, 1974), who used it for presenting information to specialty-oriented students (i.e., students oriented towards occupational and technical education),
- bar and line graphs--formats that have been found effectively to communicate trends, patterns, and comparisons (the content of the information item dictated which of the graphs were used),

National Center for Higher Education Management Systems at WICHE

FIGURE 1

COULD WE HAVE 15 MINUTES OF YOUR TIME? Last spring, a survey was conducted that explored prospective college students' needs for various items of information about a college that are often unavailable to such students. Approximately 4,000 high school seniors, counselors, college students and parents around the country completed the survey questionnaire. Twenty-nine of the over sixty information items on the questionnaire were perceived to be especially important by the various groups surveyed.

DIRECTIONS. On this sheet you are being asked to give your opinions concerning different ways of presenting different kinds of information about colleges that are demonstrated on the other sheets. You will note on the front and back of each attached sheet that five alternative ways of presenting the same information are illustrated, and that examples are shown side-by-side for two colleges, College A and College B.

1. Detach this sheet (Part I) from the other sheets (Part II).
2. So that we may explore how different types of students reacted, please provide the background information requested in a-d below:

   (a) Sex ____ (b) Age ____ (c) Racial/Ethnic Category _____ (d) Program Major _____
3. Read the first page of Part II (Information Item 1), and answer Questions e and f below for Information Item 1 by checking (✓) the appropriate box in the first row of boxes for each question. *Continue in the same manner to answer Questions e and f about Information Items 2-7.*
4. Please make any comments you would like to make on the back of this sheet (for example, what other ways of presenting information, or combinations of ways, should have been considered?).
5. If the questionnaire is being completed in a group setting or was delivered to you personally, please return this completed sheet to the person in charge.

	(e) WHICH WAY OF PRESENTING THIS TYPE OF INFORMATION IS MOST UNDERSTANDABLE AND MEANINGFUL TO YOU?						(f) IN WHICH WAY OF PRESENTING THIS TYPE OF INFORMATION IS IT EASIER TO COMPARE COLLEGE A AND COLLEGE B?					
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	None are Meaningful	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	
Information Item 1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Information Item 2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Information Item 3	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Information Item 4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Information Item 5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Information Item 6	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Information Item 7	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

FIGURE 1: RATING WAYS OF PRESENTING COLLEGE INFORMATION QUESTIONNAIRE

- questions and answers--found to be an effective format for presenting more meaningful information at Syracuse University, University of California at Los Angeles, and Mountain Empire Community College, and
- script paragraphs (textual)--most information presented to students by colleges today use this format exclusively.

Subjects selected among five written formats (tables, tables and cartoons, script paragraph, question and answer, and charts and graphs) in responding to the questions:

- "Which way of presenting this type of information is most understandable and meaningful to you?" and
- "In which way of presenting this type of information is it easier to compare College A and College B?"

Research Design and Analysis

Previous analysis of the NCHEMS Better Information for Student Choice data base on preferences for written formats consisted of only a simple tally of responses and visual data scan for the survey group as a whole and did not include comparisons with high school students (Lenning & Cooper, 1978). In comparison, the research design developed for this study analyzes the data at several levels in order to test the hypotheses (see figure 2).

Responses were analyzed using descriptive statistics, chi square analysis, and for the relationship of age to the selection of format, analysis of variance. Tests of statistical significance were computed with assistance of SPSS (Statistical Package for the Social Sciences: Version 8). For the analyses, level of significance was set at $\alpha \leq .01$.

Review of the Findings and Discussion of Implications

The findings of the study are reviewed in this section. Implications for potential use by persons preparing written information are also discussed.

The tests of the hypotheses using chi square are shown in Table I. The statistically significant values of chi square indicated a relationship between preference for the most meaningful written format and the variables of sex, age,

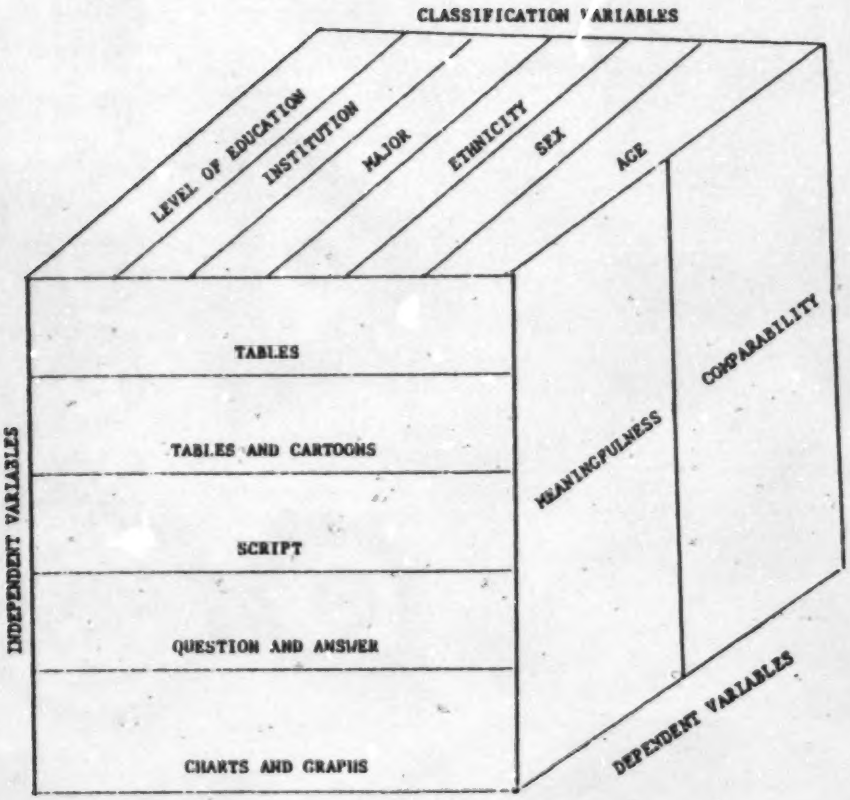

FIGURE 2

INDEPENDENT, DEPENDENT, AND CLASSIFICATION VARIABLES USED IN THE STUDY

TABLE I

SUMMARY OF THE TESTS OF HYPOTHESES USING CHI SQUARE

HYPOTHESIS	REJECTED	NOT REJECTED	VALUES OF χ^2	DEGREES OF FREEDOM	PROBABILITY
H_{1a}: Meaningfulness x Format	X		$\chi^2 = 166.13$	30	$\leq .001$
H_{1b}: Comparability x Format	X		$\chi^2 = 134.5$	24	$\leq .001$
H_{2a}: Meaningfulness x Sex	X		$\chi^2 = 141.6$	5	$\leq .001$
H_{2b}: Comparability x Sex		X	$\chi^2 = 1.63$	4	$> .05$
H_{3a}: Meaningfulness x Age	X		$\chi^2 = 65.84$	15	$\leq .001$
H_{3b}: Comparability x Age	X		$\chi^2 = 82.11$	12	$\leq .001$
H_{4a}: Meaningfulness x Ethnicity	X		$\chi^2 = 16.16$	5	$\leq .01$
H_{4b}: Comparability x Ethnicity		X	$\chi^2 = 7.03$	4	$> .05$
H_{5a}: Meaningfulness x Major	X		$\chi^2 = 143.05$	60	$\leq .001$
H_{5b}: Comparability x Major	X		$\chi^2 = 98.6$	48	$\leq .001$
H_{6a}: Meaningfulness x Institution	X		$\chi^2 = 91.73$	25	$\leq .001$
H_{6b}: Comparability x Institution	X		$\chi^2 = 327.02$	20	$\leq .001$
H_{7a}: Meaningfulness x Level of Education	X		$\chi^2 = 873.83$	5	$\leq .001$
H_{7b}: Comparability x Level of Education	X		$\chi^2 = 50.07$	4	$\leq .001$

ethnicity, major, institution (or possibly region of the country), and level of education (high school vs. college). Significant statistical relationships were also demonstrated between the selection of the most comparable written format and the variables of age, major, institution (or possibly region of the country), and level of education. Tests of significance were also conducted on the total sample for the questions of selection of format based on meaningfulness, and the usefulness of the format in making comparisons.

Significant chi square values found for meaningfulness and comparability variables have several implications for those preparing written information. The recommendations are based upon substantive findings, where respondents indicated a majority preference for a specific format. The primary finding is that the format selected by the large majority of respondents as being meaningful and useful in making comparisons was the tabular format, not the script format.

For the question of most meaningful format, tables with cartoons were selected second-most frequently, with the question and answer format third. For the question of most comparable format, charts and graphs were selected second-most frequently followed by tables with cartoons.

In developing written information, greater use should be made, where possible, of tabular information in order to improve the meaning and comparability of information. The use of interesting cartoons or other graphics may enhance the information presented in tables. Comparability of information may also be improved by the use of bar graphs. The very limited item testing conducted in this study showed some variation in selection of the charts and graphs format, which was less frequently selected when line graph formats were used in the information item, and more frequently selected when bar graph formats were used. Perhaps the broadest implication in this area was summarized by a respondent who commented:

> I think that when relaying information of this type to students, it becomes more meaningful when an explanation of the data is given along with a table of values for instant comparisons.

Thus, a useful format combination might include the question and answer format with the data presented in tables for ease of comparison.

The significant statistical findings related to the various classification (or segmenting) variables gathered in the study and selection of format by respondents indicate the need for further study in this area. The information provides some interesting cues for stratifying written materials for different subgroups. Basically, there are statistically significant relationships between all of the segments and the selection of the most meaningful written format. The same could be said for most of the segments and the selection of most comparable written format.

Institutions are becoming more concerned about segmenting their markets to determine needs amongst their potential clients, and in order to attract the specific target segments for which their programs are most appropriate. This concern for segmentation has grown from the increased competition for scarce resources (attracting students, retaining students, maintaining or developing an institutional image and position, building on institutional strengths, etc.), and the increasing use of marketing techniques coordinated by institution-wide efforts (as advocated by Johnson, 1979 and Kotler, 1975).

The following discussion characterizes the way in which the study findings analyzed by segment, might be used to prepare materials targeted to the segment being discussed.

Written materials targeted by sex (e.g., targeted to homemakers, to prospective students at single sex colleges and high schools, and so forth) might include more tabular presentation of material for males, and more items in question and answer format for females. This difference in preference for format might be an indicator pointing to the use of the previously suggested "mixed" format consisting of the question and answer format linked to tables for comparison purposes.

Segmentation based upon age of the target group (target market) might use more tabular presentation for younger age groups, and more question and answer format for older age groups. More detailed generalization about the effect of age on format for preference awaits a study using a broader sample of age ranges than was available through the data base used for the current study. With greater numbers of respondents in the older age categories, differences in preference might be accentuated.

Differences in responses by ethnic minorities and Caucasians indicate sizeable agreement as to preference for the tabular format. However, minority respondents found the addition of cartoons more useful than Caucasian respondents. Additionally, minority respondents indicated less preference for formats requiring reading of information and conversely were more disposed toward formats that did not require reading of text. Therefore, written materials developed for the minority population may more effectively communicate the information if they use cartoons, tables, and graphs. Interviews conducted during the previously noted information needs assessment by Lenning and Cooper (1978) indicated a desire by minority students for information targeted to them about special minority programs and activities, the number of minority students on campus, catalog types of items profiling minority students, etc. This information might be provided using the findings stated above. The data base did not have sufficient representation from separate minority groups (e.g., blacks, Asians, etc.) to study differences at this level, although it may be surmised from the different information needs of students discussed in Lenning and Cooper (1978) that format preferences may also vary by specific ethnic background.

The data related to majors/programs implies that differences in preferences for format might be used by those individuals preparing materials targeted for specific majors, programs, centers, schools, and colleges. Thus, a department preparing materials for students in the physical sciences might preferably use

materials that consist of tables and graphs but a college of engineering might preferably use the tables with question and answer format combination. The findings for this variable were of special interest to this researcher whose intuitive conclusions about format preferences were not always consistent with the findings for many majors. Majors expected to show a high preference for graphic format (e.g., engineering) indicated, instead, a substantial response to the verbally oriented formats (script and question and answer). Nevertheless, for engineering the majority preferred the tabular format. Majors typically associated with verbal ability of students (letters, for instance) do not necessarily show a high preference for script or question and answer formats. In summary, preliminary data obtained about the preferences of students in different majors for written formats does not indicate the expected linking of technical fields to technical formats (and vice-versa) but rather unique preferences are demonstrated for each major area. It should be noted that information in the data base was gathered from students who had not spent a length of time in their declared major field. It is possible that preferences for written information format by junior or senior year students might differ from the results discussed above.

The type and level of institution a student is attending appears as a potentially useful segmenting variable for the data analyzed. The basic implication is that students attending major research universities have a greater preference for the tabular format than do other students. Furthermore, if a continuum can be created by type of institution, running from major research universities to high schools, the preference for the tabular format would decrease toward the high school end of the continuum. Most likely, the use of non-verbal formats (those that do not require reading of sentences or text such as tables and graphs) would be most preferred by the high school segment, as would the addition of well done cartoons and/or photography. College students as indicated above, tend to prefer tabular formats.

Conclusion

Written formats tested in this study were selected differentially by respondents based upon the ability of the format to present information in a meaningful/understandable manner, and in a manner that made for ease in comparison of information. This result supports the finding by Sciglimpaglia (1977) that type of information display effects the ability of a person to process information.

Different segments of the population were also found to respond in different ways to written formats. This information might be used in the development of information targeted to a segment of the population with whom a college is attempting to communicate. The use of appropriate formats in communicating with students and prospective students in general, as well as specific segments of the student population, might improve their processing of information, thus, closing an important link in the marketing process--and leading to better decisionmaking by students.

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